Idaho

Area Wide Optimization Program

(AWOP)

Second Annual Report

July 1, 2005

Idaho Area-Wide Optimization Program (AWOP)

Year Two (July 2004 - June 2005) **Annual Report**

July 1, 2005

Executive Summary

This second annual report for the Idaho Area Wide Optimization Program summarizes what has been done to sustain and enhance the program in Idaho since the last annual report, and documents the status and progress of all 17 coagulation plants operating in the state. It should be noted that there is a 12 month "lag time" between data collection/analyses and annual report. This annual report (July 2004 – June 2005), analyses and reviews plant turbidity data for the period of July 2003 through June 2004.

Turbidity level of treated water is one of the best measures of the quality of the water delivered to consumers. The greater percentage of time a utility produces lower turbidity water the greater the protection of public health. In comparing 95th percentile turbidity between the baseline year and year two, there was improvement in 13 of the plants, no change in 1 plant and a turbidity decline in 3 plants. Looking strictly at population - 90% of the people receiving treated surface water from coagulation plants obtained lower turbidity water in year 2 than in the baseline year. The goal of AWOP is to continually assess and document the finished water of Idaho's coagulation plants. If declines are seen in water quality, it is the goal of AWOP to recognize that decline and attempt to provide assistance and tools to the water system to mitigate the situation.

Please refer to Figure 1 which demonstrates the three basic components of the AWOP model. The primary focus in the baseline year was on the status component. The primary emphasis of year two has been the targeted performance improvement component. The principal focus of targeted performance improvement component has been the implementation of Performance Based Training (PBT). The successes of this AWOP year are many and can be reviewed as desired on the following pages.

The expansion and maturity of the Area Wide Optimization Program can take many directions in the state of Idaho. Funding and participation will shape the program in the future but already there are plans in place for an Idaho AWOP newsletter linking all coagulation plant operators. In addition are plans for supplemental training following PBT and expansion into the area of slow sand filtration plants. As DEQ reinforces more of a mentoring role with water treatment plants and operators, it follows that water quality and in turn public health protection will be improved.

AWOP in Idaho

Idaho AWOP History

The Area Wide Optimization Program (AWOP) is designed to assist public surface water treatment plants that use coagulation and filtration to improve their treatment performance. AWOP was initiated in the 1990s as a pilot program in EPA Region 6. In its current state of evolution AWOP consists of three interrelated components (Figure 1).

EPA Region 10 began promoting Area Wide Optimization in December 2002. In the spring of 2003, Idaho submitted a work plan to EPA proposing use of capacity development funds for surface water treatment plant optimization. EPA approved the work plan, paving the way for Idaho to join AWOP.

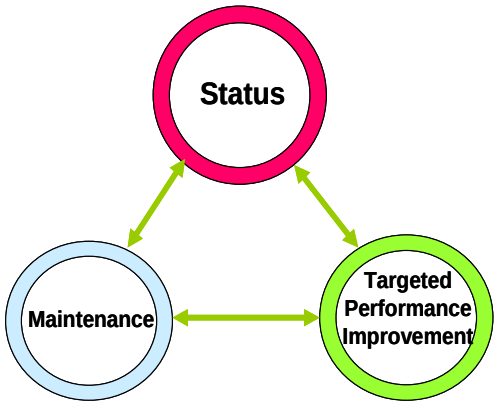

Figure 1. AWOP Components Model

Program Components

The *status component* is the primary focus during the start-up year of an AWOP program. It includes defining the program, developing prioritization criteria, assessing the water treatment plants and introducing the optimization concepts to water system operators. The *targeted performance improvement (TPI) component* uses existing tools (e.g. Sanitary Surveys and Optimization Software) to determine the factors limiting system performance and help plant operators understand the changes needed to optimize performance. TPI implements appropriate follow-up using the following tools:

- Comprehensive Performance Evaluations (CPEs),
- Comprehensive Technical Assistance (CTA), and
- Performance Based Training (PBT).

These tools are all designed to help water plant operators gain a better understanding of water treatment plant operations necessary to optimize their facility. The *maintenance component* integrates lessons learned back into the AWOP. It is designed to initiate and sustain quality control activities and integrate findings from AWOP activities into other related state programs.

Each of the three components of the model is constantly developing and exerting influence on the other two components. Reviewing any component of the model allows for a continuous ability to assess plants' needs and identify priorities throughout the state.

Idaho AWOP Activities

Status Component

The first year of the program was primarily devoted to the status component. The history of activities of the baseline year (year 1) can be reviewed in the First Annual Report released in April of 2004. The major activities included:

- Development of a coagulation plant questionnaire to assess plant design and operation
- Adoption of optimization goals
- Site visitations
- Introduction of Turbidity Optimization Software
- Development of prioritization criteria
- Collection of baseline year turbidity data
- Ranking Idaho coagulation plants based on prioritization criteria

In 2004, a new AWOP coordinator visited all the coagulation plants a second time and again invited the non-participating plants to join the program. Two plants (Bonner's Ferry and Priest River) chose to join upon this second invitation. These plants completed a plant questionnaire and were introduced to the Turbidity Optimization Software. They also began the process of having their city councils adopt optimization goals.

AWOP is a voluntary program, so operators and municipalities are not required to join. It is therefore a constant challenge to motivate operators towards these optimization activities and goals. Many joined with the expectation of enhanced technical assistance and training but not a complete awareness of AWOP concepts. Much of the status component in year two involved reiterating the AWOP concepts and encouraging participation.

Combined Filter Effluent (CFE) turbidity profiles were developed and are presented in Table 1. This table documents changes in achieving turbidity optimization goals from plant to plant and from year to year.

Individual plant achievement of the turbidity optimization goal of 0.1 nephelometric turbidity units (NTU) compared between year 1 (the baseline year) and year 2 is shown in Figure 2.

Success in achieving the optimization goal of 0.1 NTU compared with achieving the regulatory requirement of 0.3 NTU that became effective in January 2005 is graphed in Figure 3.

Table 1 CFE Turbidity Data

COMBINED FILTER EFFLUENT TURBIDITY DATA

Plant:	Baseline NTU 95th Percentile	Year 2 NTU 95th Percentile	Δ NTU Improvement Decline	Baseline %Values ≤0.1 NTU	Year 2 %Values ≤0.1 NTU	Baseline %Values ≤0.3 NTU	Year 2 %Values ≤0.3 NTU
Horseshoe Bend	0.05	0.04	20%	100	100	100	100
Sandpoint Sand Creek	0.05	0.05	0%	99.2	100	100	100
Elk City	0.3	0.06	80%	56.8	100	100	100
*Riverside	0.23	0.07	70%	66.2	100	100	100
Sandpoint Lake Plant	0.13	0.08	38%	90.6	100	96.2	100
Carlin Bay	0.05	0.09	-80%	98.9	98.7	99.4	100
Lewiston	0.09	0.07	22%	98.3	98.6	99.6	100
Priest River	0.3	0.09	70%	3.8	98.4	96.2	100
McCall	0.08	0.06	25%	98.4	97.8	100	100
Juliaetta	0.11	0.09	18%	93.9	97.4	100	100
United Water Marden WTP	0.14	0.09	36%	89.8	97.4	99.7	100
*Kamiah	0.16	0.11	31%	86.5	94.3	100	100
Orofino	0.41	0.19	54%	50.1	86.9	87.9	97.5
Bonners Ferry	0.32	0.5	-56%	77.5	57.4	94.8	80.1
Pierce	0.28	0.25	11%	54.4	47.5	96.2	99.2
Laclede	0.2	0.26	-30%	41.9	19.1	99.1	97.3
Weiser	0.32	0.27	16%	29.6	14.3	94	97.8

*Plants that elected not to join AWOP in year 2.

(Baseline Year = 7/02 - 6/03)
(Year 2 = 7/03 - 6/04)

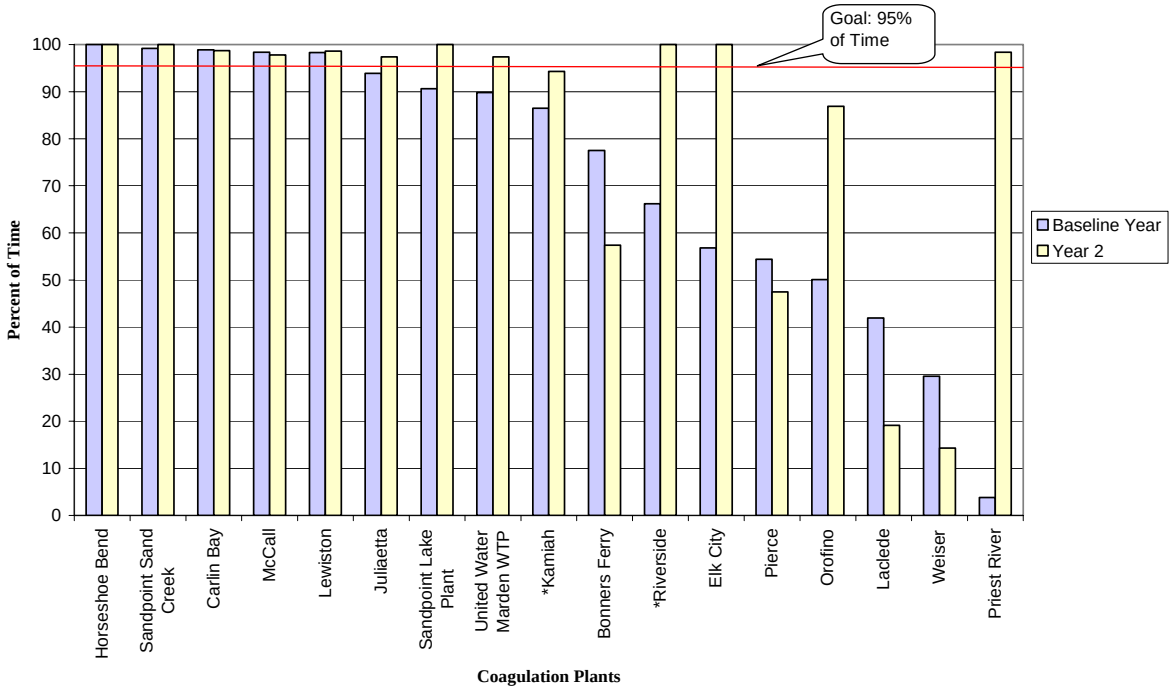

Figure 2. Comparison of year 1 (baseline) and year 2 Combined Filter Effluent turbidity.

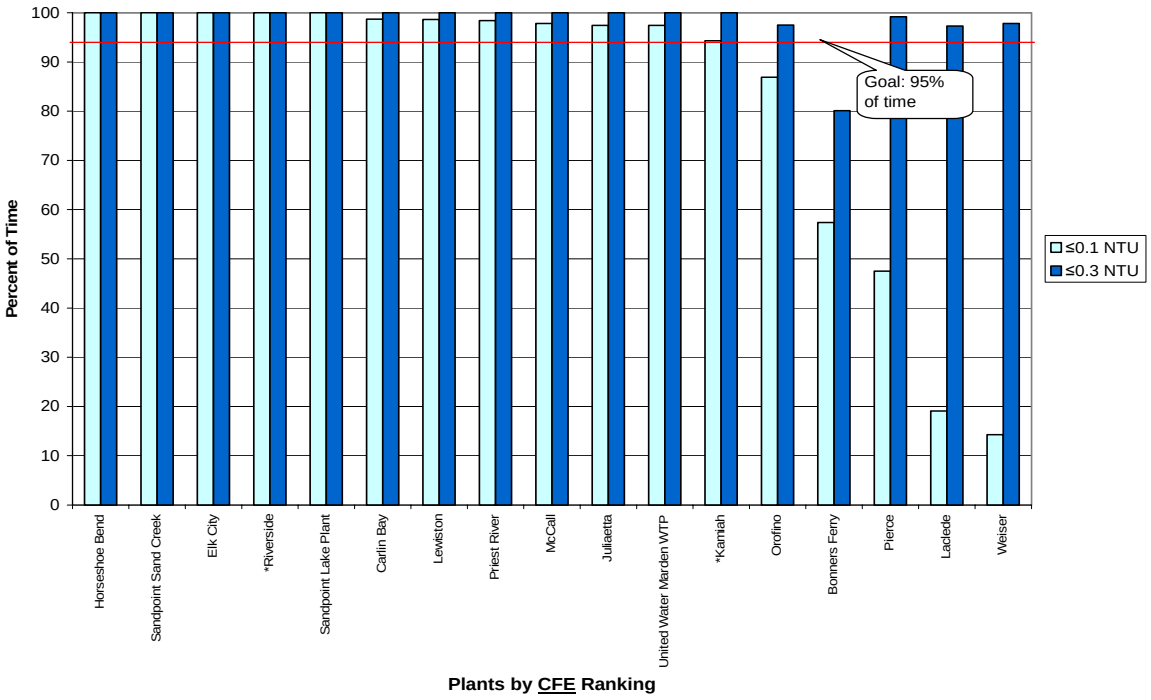

Figure 3. Achievement of Combined Filter Effluent turbidity levels in year 2.

Plant Ranking

The prioritization criteria developed in the baseline year was used to score and rank all coagulation plants in the state. Please refer to Appendix A (Criteria Scoresheet) for the worksheet used in prioritization ranking. Appendix B is the overall ranking spreadsheet which adds the dimensions of violations, operations, plant changes, and source water vulnerability to final turbidity results to assess the overall state ranking. It should be remembered that in overall ranking, the ***lower*** the number a plant achieves, the ***higher*** the quality of the water. Plants scoring low in overall ranking should translate to plants most adept at protecting public health. Figure 4 shows the relative number of overall points achieved in year 2 versus the baseline year. This graph illustrates which plants experienced significant changes in ranking points. The most dramatic decreases were seen by the cities of Riverside, Elk City, Orofino, and Priest River. This was due to dramatic improvements in the turbidity of their finished water. The cities with significant increase in points include Laclede, Bonner's Ferry, and Horseshoe Bend. Laclede's increase is most attributable to an improvement in turbidity reporting. Bonner's Ferry continued to struggle with the aftermath of a watershed fire that turned their focus away from optimization during this assessment period. The increase in points at Horseshoe Bend is primarily due to failure to monitor chlorine residual. It is expected that these three plants will realize a reduction in overall points in the upcoming year.

A decrease in overall ranking points indicates an improvement in attaining optimization and thus an improvement in public health protection. In the baseline year, the total number of points assigned to **all** Idaho coagulation plants was 1556. In year 2, that number had dropped by 22% to 1212 as represented in figure 5 on the following page.

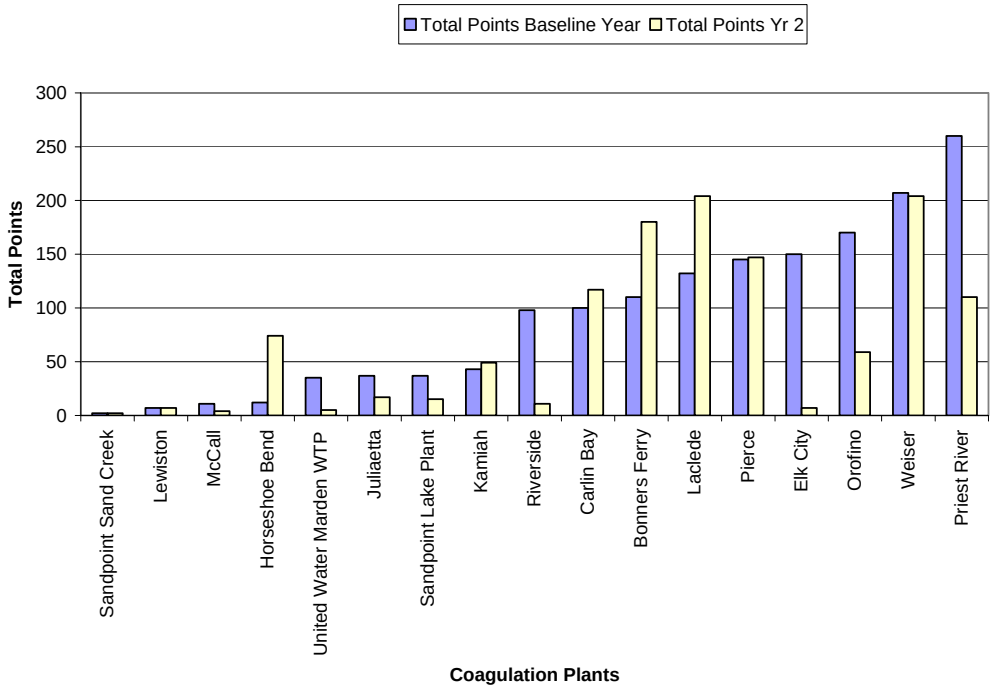

Figure 4. Comparison of overall rating points for year 1 (baseline) and year 2.

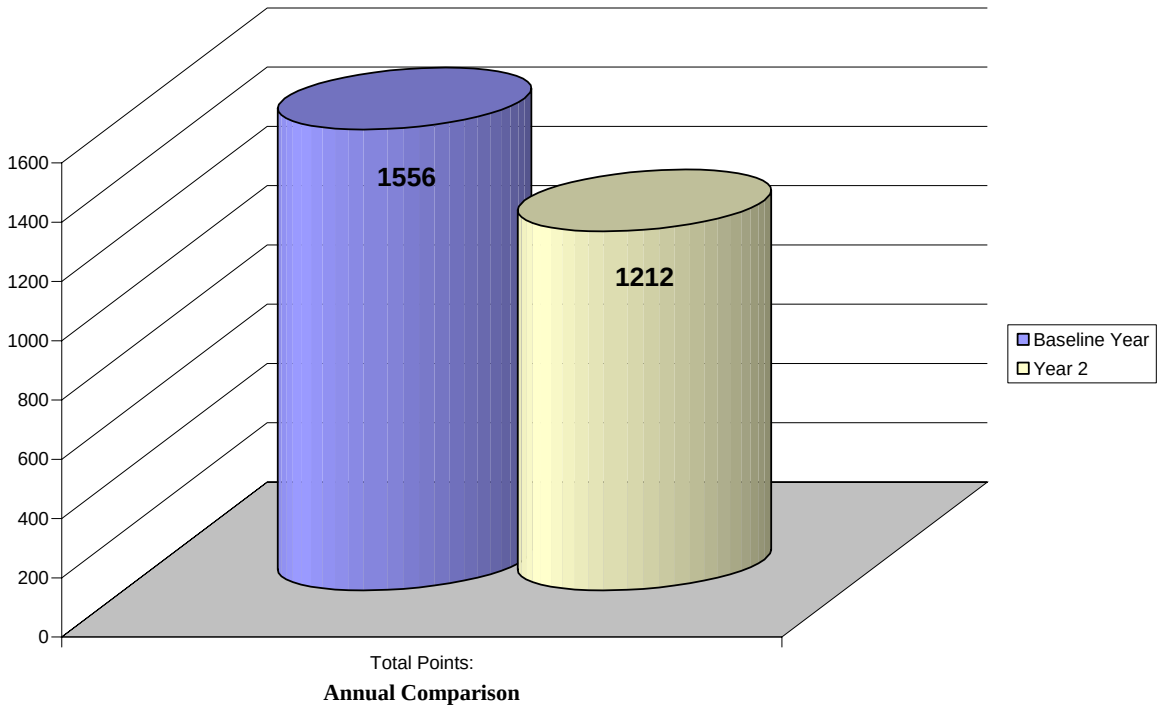

Figure 5. Total overall ranking points for all Idaho AWOP plants.

Targeted Performance Improvement Component

Idaho continues to develop tools for this component of the AWOP model. These tools are utilized when the maintenance or status component indicates a lack of progress towards optimization goals. The status and maintenance components help prioritize where to apply technical assistance. The technical expertise of Department of Environmental Quality (DEQ) state drinking water staff is part of the TPI component and must be constantly upgraded to provide support to coagulation plants working to achieve the optimization goals. Support to water plants can take the form of interpreting new drinking water regulations or providing assistance on calibration of pumps, turbidimeters or chlorine analyzers. AWOP personnel have taken a role in helping systems comply with the new Long Term 1 Enhanced Surface Water Treatment Rule (LT1SWTR) that came into effect in January 2005. Oftentimes, mere discussion of a new concept can be the impetus for plant improvements that protect public health. Priest River has recently contracted to install a remote monitoring and alarm system as a result of enhanced understanding of the benefits of such safeguards.

Comprehensive Performance Evaluation

One tool offered to our staff has been the Comprehensive Performance Evaluation (CPE). In March 2004, EPA hosted a CPE in Longview, WA. As part of Region 10 AWOP, four DEQ staff members were invited to participate. A CPE consists of thorough review and analysis of a facility's design capabilities along with review and analysis of their administrative, operational, and maintenance practices related to achieving optimum performance. This is an intensive learning experience for the facility and for all that participate. In November 2004, one DEQ staff member from the Boise regional office attended an additional CPE in Petersburg, Alaska, hosted by Alaska Technical Training Center. The expertise gained in these CPEs is being utilized by DEQ staff in the form of technical assistance to individual plants and assisting with facilitation of Performance Based Training.

Performance Based Training

Since 1988, more than 100 CPEs have been conducted in the U.S. and Canada. In time, it became evident that there were common and repetitive factors limiting plant performance. Rather than target each plant with individual technical assistance, a program was developed that could address similar problems in multiple facilities simultaneously. EPA Region 6 piloted Performance Based Training (PBT) in 1999 and it has been regionally expanded and technically refined through the years.

PBT brings together trainers, facilitators, water plant operators, and administrators. After an initial session for facilitators only, there are 5 additional sessions over a period of 12 to 15 months. The training is progressive, with each new session building on the previous one. The sessions include both classroom and in-plant training and are supported by operator homework assignments and periodic phone facilitation.

The following tasks were accomplished in Idaho over the past year in Idaho:

- Plant interviews completed and selection of plants for inclusion into PBT
- Selection of facilitators for PBT completed
- Facilitator Training in Lewiston conducted by Process Applications, Inc. (PAI) – *November 2004*
- Dates and locations for all PBT sessions set
- Session 1 conducted by PAI – Lewiston Water Treatment Plant– *December 2004*
- Session 2 conducted by PAI – Weiser Water Plant - *March 2005*
- Session 3 conducted by PAI – Lewiston Water Treatment Plant – *May 2005*

<u>Facilitator Training</u>

EPA contractor PAI conducted training for 9 facilitators. The objective of this training was to develop skills to better support water system personnel during PBT Training. A full day of workshops were conducted on optimization assessment software, jar testing software, and the special study approach to problem

solving. An additional half day was spent in on-site training at the Lewiston Water Treatment Plant. Each facilitator was assigned a water plant.

PBT Session 1 - Optimizing Performance Goals

This session was attended by approximately 40 people. Included in the class were 16 operators from 8 coagulation plants and 12 administrators from 7 municipalities. Administrators were encouraged to attend this session to solidify internal commitment to the program. This session outlined the history and objectives of PBT. Workshops were conducted on: defining a water professional; assessing plant performance; and sampling, testing, and data development.

Site Visitation

Following Session 1, facilitators conducted on-site visits to their assigned plants. The site visit consisted of a plant tour to assess the raw water source, water quality testing, and type and extent of treatment being employed. Photographs were taken and a plant schematic was developed. The plant operator and facilitator worked together to complete an on-site evaluation form.

PBT Session 2 - Developing Problem-Solving and Priority-Setting Skills

Session 2 was conducted at the Weiser Water Treatment Plant. Thirty people attended this session including three observers from the Oregon Drinking Water Program, two observers from Washington Department of Health and one observer from Idaho Rural Water Association. Each plant operator presented an oral report on homework assignments from the first session. Most operators included written handouts as part of their presentation. A workshop was conducted in the morning on developing and implementing special studies. Participants were divided into five teams for the afternoon "hands-on" session. All teams went through a basic feed pump calibration. In addition, each team conducted a special study within the Weiser Water Treatment Plant and presented their results at the end of the day.

PBT Session 3 - Coagulation Control Tool Development

Session 3 was again hosted by the Lewiston Water Plant. Class began with operator feedback on homework assignments. Operators had designed and conducted special studies in their own plants. Operators reported on progress, discoveries, and conclusions over the course of each study. Jar testing calibration and coagulant dosing were introduced to the class with a workshop. Five teams were formed in the afternoon for "hands-on" special studies in the water plant. Each study focused on a different aspect of jar testing and dosage control. A summary of all studies was prepared and a report generated at the end of the day. Plant operators will take the skills learned here and apply them to the conditions specific to their own plant. They will report back on their findings at the September session.

The following components remain for completion of Performance Based Training in Idaho:

- Session 4 - "Assessing Current Plant Performance/Applying Skills & Tools" - *Sept 2005*
- Session 5 - "Reporting on Success" - *December 2005*
- Post PBT turbidity comparisons - *May 2006*

Maintenance Component

The maintenance component is just beginning to develop in Idaho. It is designed to be a proactive way of integrating with other state programs. AWOP activities have influenced changes in the Enhanced Sanitary Survey for surface water systems. Operators are receiving CEUs to support their operator certification requirements through participation in Performance Based Training. PBT is also supporting capacity development for surface water systems.

By the end of the second year site visitations, it was apparent that only four of the participating plants were actively utilizing the optimization concepts and software. As in the baseline year, the majority of the turbidity data was collected and entered by the AWOP coordinator from the water systems' compliance Surface Water Treatment Rule (SWTR) report. In terms of turbidity optimization, this data is, at best, imperfect. The SWTR report is designed to track regulatory compliance of water leaving the plant. However, optimization must be tracked by following turbidity through all treatment processes within the plant. As the program matures, each plant's input to the SWTR report should more accurately represent its turbidity optimization data. Learning the importance of accurately collecting, recording, and entering turbidity data is all part of the AWOP process and will influence the maintenance component in the future.

Year 2 Successes

Year 2 Idaho AWOP individual plant successes:

- **United Water -** In the baseline year, United Water achieved the turbidity optimization goal of ≤ 01. NTU **89.8%** of the time. In year 2 they achieved the goal **97.4%** of the time. While this improvement is clearly substantial, it is additionally significant when considering the population served by United Water. United Water currently serves 90,000 people in the Boise area with water from their coagulation plant. This represents about 65% of the population served by coagulation plants statewide in Idaho. United Water anticipates a 3% annual increase in population which will make their continued participation in AWOP important to public health protection in Idaho.

- **Priest River -** In 2002, a CPE was performed at the Priest River water plant. Baseline data on Priest River indicated achievement of the optimization goal of ≤ 01. NTU only **3.8%** of the time. With a new operator and marginal turbidity results, Priest River was hesitant to join AWOP in 2003. The new operator has worked actively with DEQ and made many positive changes within the plant. In year 2, they were eager to join AWOP and achieved the optimization goal **98.4%** of the time. In statewide ranking for combined filter effluent turbidity data, they moved from 17th place in the baseline year to 8th place in year 2.

- **Bonner's Ferry -** This system declined the invitation to join AWOP in 2003, due to a shortage of personnel and resources. Fire damaged their Myrtle Creek watershed in September 2003. Since that time Bonner's Ferry has been receiving additional attention from the Coeur d'Alene DEQ drinking water staff. A very positive relationship has developed between Bonner's Ferry and DEQ. Bonner's Ferry joined AWOP in the second year and is now actively optimizing and participating in PBT. Although year 2 results do not show an improvement in turbidity results, Bonner's Ferry must be considered an AWOP "success" by virtue of their new found commitment to this program. We expect that in year 3, they will rate as one of the most improved plants within the state.

- **Orofino -** Baseline year data indicated an achievement of the optimization goal of ≤ 0.1 NTU only **50.1%** of the time. This water plant was built in 1942 but they have plans for a new water plant within the next five years. At first glance, their interest in AWOP was marginal. In year 2, they have made a recommitment to the AWOP goals and achieved the turbidity optimization goal **86.9%** of the time. They are currently participating in PBT and are committed to optimizing their old plant with tools they expect to obtain from this program.

- **Lewiston -** The City of Lewiston has traditionally embraced any and all suggestions for improved water quality and public health protection. They were quick to join AWOP in the baseline year and were already achieving the turbidity optimization goal of ≤ 0.1 NTU **98.3%** of the time. In year 2, they achieved that goal **99.6%** of the time. As impressive as this is, their biggest contribution has been the leadership role they have played as they champion the benefits of optimization and PBT. They were the first plant in Idaho to be approached regarding performance based training and they immediately offered to host all

sessions at their facility. They have been a leader in PBT and have volunteered their time and expertise to assist other plants as necessary.

- **Weiser –** Weiser is another facility to be recognized as a success — not because of where they were in year 2, but because of where they are going. They joined AWOP in the baseline year while new sedimentation basins were under construction. There have been operational struggles to bringing the new basins online. In spite of this roadblock, Weiser chose to join performance based training and host the second session at their plant. They have been helpful to other coagulation plant operators by being candid about the difficulties they have encountered and by communicating their positive attitude and their commitment in spite of the difficulties.

Year 2 Idaho AWOP statewide successes:

- **Turbidity Optimization. -** Data showed that in the baseline year only five of 17 coagulation plants (or **29%**) were meeting the CFE turbidity optimization goal ≤ 0.1 NTU) 95% of the time or more. In year 2, **six** more plants (Riverside, Sandpoint Lake Plant, United Water, Priest River, and Juliaetta) were added to the attainment list, bringing the total to 11 plants (or **65%**).

- **Computers Assistance** - Many of the plants participating in AWOP have historically been limited in their ability to optimize by a lack of adequate computers. As part of PBT, DEQ surplus computers were offered to each participating plant. Seven of the eight plants took advantage of this offer and all are utilizing theses computers in their water plants.

- **Population. -** The greatest indicator of a plant's attainment of optimization goals is an increase in the percent of time their combined filter effluent is recording a turbidity of ≤ 0.1 NTU. As turbidity decreases, a higher quality of water is served to the public. In Year 2, 138,000 citizens received water from coagulation plants, and 90% of them received water in year 2 that was of lower turbidity (i.e., higher quality) than in the baseline year.

Looking Forward

As the second full year of AWOP participation in Idaho comes to a close there is still much work to be done. The status of all coagulation plants will be reviewed in the coming year. Sessions 4 and 5 of Performance Based Training will be completed and the success of the training will be assessed. The momentum that has been launched through PBT must be utilized to expand the program to include more water plants. A newsletter will be developed to promote the communications that have emerged during the PBT sessions. Plans are progressing toward additional training specifically for coagulation plants. In addition, there are plans to co-sponsor a surface water treatment workshop in conjunction with the Pacific Northwest Section American Water Works Association (PNWS-AWWA). There is potential for introducing other types of surface water treatment plants to the concepts of optimization. Year 3 also calls for the development of status component criteria for slow sand filtration plants in Idaho.

Through the efforts described above the concepts of optimization can be expanded to all drinking water plants in the state of Idaho. With optimization will come improved relationships between water utilities and DEQ as well as improved public health protection for the citizens of Idaho.

Appendix A
Criteria Scoresheet

Idaho AWOP Criteria Scoresheet
Year 2 (July 2003 - June 2004)

Date Completed:

Plant Name& ID:

Population Served:

Population Served by Coagulation:

SDWIS says….

1. Percent of Time CFE Turbidity is < 0.1 NTU

Evaluation	Score
95-100	0
90-94.99	10
85-89.99	20
80-84.99	30
75-79…	40
70-74…	50
60-69…	70
50-59…	90
40-49..	100
30-39..	120
20-29..	140
10-19..	160
0-9…	180

2. 95th Percentile CFE Turbidity

Evaluation	Score
< 0.1 NTU	0
0.11 to 0.15 NTU	10
0.16 to 0.2 NTU	15
0.21 to 0.25 NTU	20
0.26 to 0.30 NTU	30
>0.3 NTU	50

3. Settled Water Turbidity Recorded

Evaluation	Score
Yes or Not Applicable	0
No	5

4. Individual Filter Turbidimeters

Evaluation	Score
Yes	0
No	10

5. Filter to Waste

Evaluation	Score
In use	0
Not available/not used	10

6. Hours of Operation

Evaluation	Score
24 hr. per day	0
Shutdown overnight	5
Intermittent with frequent on/off	10

7. Operator on Duty/Alarm Systems

Evaluation	Score
Yes	0
No but alarms page operator	2
No but alarms shut down plant	5
No and alarms disabled/inoperable	15

8. Major Change at Plant in Last Year

Evaluation	Score
No	0
Yes	5

9. Operator Actively Optimizing

Evaluation	Score
Yes	0
No	10

10. Source Water Vulnerability

Evaluation	Score
Low	0
Moderate	3
High	5

11. Violations (CT Ratio, TTHM, HAA5, Bromate, TOC/Alkalinity)

Evaluation	Score
None	0
TT	5
MCL	5
Monitoring	2
Reporting	2

12. 5 or more Stage 1 and/or LT1 TT, MCL, M/R Violations

Evaluation	Score
No	0
Yes	50

Appendix B
Overall Ranking

July 2003 - June 2004

Plant Information

PWSNO	1090073	3440011	1110003	2180027	1280039	1090107	4080024	2180024	2310003	2290018	1090121	2180032	2350014	2250017	4010016	4430033	1090121
Plant Name	Laclede	Weiser	City of Bonners Ferry	Pierce	Carlin Bay	City of Priest River	Horse-shoe Bend	Orofino	City of Kamiah	Juliaetta	Sand point Lake Plant	Riverside Indepen-dent Water Dist	Lewiston	Elk City	United (Marden)	McCall	Sand Creek Plant
Population (served by coagulation treatment)	400	5343	4000	618	90	2300	760	1609	1307	840	*	2000	16500	350	90000	4000	8000
Total Population Served by Coagulation: 138117																	
Last Sanitary Survey	1/9/03	9/29/00	4/10/02	3/5/03	6/28/04	1/9/03	6/30/04	6/17/03	4/10/02	7/11/02	12/16/03	7/7/04	10/28/002	4/8/03	4/30/04	5/30/04	12/16/03
Percent of Coagulation Population	0.3%	3.9%	2.9%	0.4%	0.1%	1.7%	0.6%	1.2%	0.9%	0.6%		1.4%	11.9%	0.3%	65.2%	2.9%	5.8%
Criteria	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**	**Score**
Percent of Time CFE Turbidity <= 0.1 NTU	160	160	90	100	0	0	0	20	10	0	0	0	0	0	0	0	0
95th Percentile CFE Turbidity (NTU)	30	30	50	20	0	0	0	15	10	0	0	0	0	0	0	0	0
Settled Water Turbidity Recorded	0	0	5	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Individual Filter Turbidimeters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Filter to Waste	0	0	10	0	0	0	0	0	10	0	0	0	0	0	0	0	0

July 2003 - June 2004

Plant Information

PWSNO	1090073	3440011	1110003	2180027	1280039	1090107	4080024	2180024	2310003	2290018	1090121	2180032	2350014	2250017	4010016	4430033	1090121
Plant Name	Laclede	Weiser	City of Bonners Ferry	Pierce	Carlin Bay	City of Priest River	Horse-shoe Bend	Orofino	City of Kamiah	Juliaetta	Sand point Lake Plant	Riverside Indepen-dent Water Dist	Lewiston	Elk City	United (Marden)	McCall	Sand Creek Plant
Hours of Operation	5	5	10	10	5	10	10	7	10	10	10	5	2	5	0	0	0
Operator on Duty/Alarm Systems	2	2	5	5	5	15	2	5	2	2	0	0	0	2	2	2	2
Major Change at Plant in Last Year	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operator Actively Optimizing	2	2	2	10	2	0	0	2	2	0	0	2	0	0	0	0	0
Source Water Vulnerability	5	5	3	0	5	5	0	5	3	5	5	2	5	0	3	2	0
Violations: CT Ratio	0	0	5	0	50	30	12	0	0	0	0	0	0	0	0	0	0
TTHM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HAA5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bromate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOC/Alkalinity	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0
> 5 CT, TT, MCL , M/R violations in year	0		0	0	50	50	50	0	0	0	0	0	0	0	0	0	0
Total Score	204	204	180	147	117	110	74	59	49	17	15	11	7	7	5	4	2
Total of all scores:	**1212**																

***** Sandpoint Lake Plant serves the SAME 8,000 population as the Sand Creek Plant.